

Missouri Energy Outlook

Semiannual Projections Of Energy Supply and Demand Summer Outlook 2004



Missouri
Department of
Natural Resources

Outreach and Assistance Center
Missouri Energy Center

This report was prepared by the Missouri Department of Natural Resources' Energy Center, an office of the department's Outreach and Assistance Center. Portions of this document related to national energy prices and supplies were adapted directly from the Short Term Energy Outlook, May 11, 2004, published by the U.S. Department of Energy's Energy Information Administration.

Additional sources of information and data contributing to the development of this report include:

1. Short Term Energy Outlook, April 8, 2004, U.S. Department of Energy's Energy Information Administration;
2. Annual Energy Outlook 2004 with Projections to 2025, January 2004, U.S. Department of Energy's Energy Information Administration;
3. Report of the Governor's Energy Policy Council, June 1, 2003;
4. National Energy Information Center;
5. Missouri Department of Revenue's Motor Fuels/Special Fuels Taxation Reports; and,
6. Missouri Department of Natural Resources' Missouri Energy Bulletins.

The Missouri Energy Outlook is a semiannual assessment of Missouri's energy markets. The assessment assists in identifying potential supply problems, including adequacy of supply, weaknesses in the distribution system, and energy price changes. The focus of this report is on recent events impacting supply and prices, and expected conditions and changes for the next six months.

Generally, the summer appraisal focuses on issues regarding summer energy use, including gasoline for the summer driving season and electricity supply and demand, and the fall appraisal focuses on the winter heating season.

The scope of the analysis varies by energy source. Petroleum markets in Missouri are affected by international and domestic market conditions, events and multi-regional refinery operations. Missouri's electricity prices, supply and availability are largely determined by events in the state and the Midwest. The price and supply of natural gas are closely tied to national trends. For the appraisal, recent historical balances between Missouri's energy consumption and supply are analyzed, and consumption and supplies are projected. Actual and expected energy prices are reviewed to identify changes impacting consumer costs.

HIGHLIGHTS

MISSOURI ENERGY APPRAISAL – SUMMER 2004

Low U.S. crude oil supplies combined with an extended demand for space heating fuels during the 2003-2004 winter season, higher-than-normal consumer demand for motor gasoline and diesel fuel this spring and a surge in crude oil demand by China are contributing to higher crude oil prices and prolonged low inventories. The geopolitical conditions in petroleum producing countries in the Middle East, Venezuela and Africa are supporting higher global crude and petroleum product prices. With the possibility of future shortfalls in both imported and domestically produced supplies of petroleum products, tighter supplies will help support stronger retail prices throughout the summer.

Petroleum - Crude oil futures prices at the New York Mercantile Exchange (NYMEX) set a new record settlement price of \$42.33 on June 1 and could remain within the \$35-\$40 range throughout the month of June 2004. Following this period, U.S. commercial crude oil prices are expected to average \$36-\$37 per barrel for the remainder of 2004, according to the Energy Information Administration (EIA). The Organization of Petroleum Exporting Countries (OPEC) continues to produce crude oil above the self-imposed quota by nearly 2.3 million barrels per day. On June 3, OPEC announced a production increase of 2.5 million barrels beginning July 1. Prior to the announcement, the EIA projected OPEC production at approximately 27 million barrels per day for 2004. Non-OPEC production is expected to increase by 1.7 million barrels per day, which should help U.S. crude inventories rebuild while moderating and possibly stabilizing crude oil prices later in the year.

Motor Gasoline - Missouri's gasoline prices are more than 53 cents per gallon higher since the beginning of the calendar year, moving from \$1.397 on January 5 to \$1.93 on May 17. If crude oil supplies remain stable and refineries and pipelines operate without unplanned interruptions, gasoline prices may peak in June reflecting the increased pressure on oil markets since April. Gasoline supplies in the Midwest and Missouri remain tight. Higher U.S. refinery utilization rates and gasoline imports this summer may help alleviate higher price pressures caused by (on-going) low inventories of motor gasoline.

Refinery Operations and Inventory Levels - This summer's relatively low inventory levels to meet the current level of consumer demand represents a potential risk for supply problems as the summer driving season gets under way. When distribution networks and refineries operate without unplanned interruptions, inventories play a small role in meeting demand. Inventory levels have trended downward over the past two decades, while petroleum consumption has increased, which may create additional volatility in prices when an unexpected supply/demand imbalance occurs.

Electricity – Missouri should have sufficient supplies of electricity this summer to meet consumer demand for cooling and for additional demand expected as the economy recovers. Missouri's electricity prices will continue to be some of the lowest in the Midwest Region, falling 1.6 percent from 2002 to 2003.

Natural Gas – Missouri's natural gas deliveries for 2004 are expected to increase by 3 percent following two consecutive years of declining deliveries. Significant winter natural gas storage withdrawals and withdrawals associated with price trade offs contributed to a significant reduction in national storage levels. Increased demand for natural gas and concerns regarding overall supplies continue to keep natural gas prices relatively high. Natural gas consumption may increase this summer as additional natural gas is used to produce electricity for cooling purposes.

Petroleum

West Texas Intermediate (WTI) crude oil prices, the benchmark used for U.S. crude oil prices at the NYMEX averaged about \$36.70 per barrel in April, a \$5.60 per barrel climb from last November. Prices are expected to average \$36-\$37 per barrel through the end of 2004.

Potential price spikes remain a danger given the uncertainties surrounding the continued recovery of output and exports from Iraq, as well as political unrest in Venezuela. In addition, the current low oil inventory levels and world oil surplus capacity levels provide only a limited cushion against any potential price spikes. World surplus capacity during 2004 fell to its second lowest level over the past three decades (the lowest occurred after the loss of Iraqi and Kuwait oil in 1990-1991). Oil price declines are expected in 2005 as Iraqi oil production continues to increase and inventories are rebuilt toward more normal levels.

World Outlook

Petroleum supplies remain low in the countries of the Organization for Economic Cooperation and Development (OECD), particularly the U.S. They are projected to remain at least slightly above observed 5-year minimums throughout 2004.

OPEC-10 (OPEC minus Iraq) crude oil production in April exceeded the new official (April 1) OPEC production quotas by an estimated 2.3 million barrels per day. Annual OPEC crude oil production including Iraq is expected to remain fairly constant at April levels through the rest of 2004-2005, allowing for some modest stock building over the period. Annual OPEC crude oil production (including Iraq) is expected to remain fairly constant (at roughly 27 million barrels per day) between 2003-2005, allowing for some modest stock building over the period. Non-OPEC oil supply is projected to increase by about 2.1 million barrels per day in 2004-2005.

Annual world oil demand is projected to continue growing by an average of about 2.2 percent in 2004 and 2005 after posting a 2.0 percent gain in 2003. Assuming these growth rates, oil demand by 2005 would be about 3.5 million barrels per day above the 2003 level.

U.S. Outlook

U.S. petroleum demand in 2003 grew an estimated 1.6 percent to just over 20 million barrels per day. Demand is projected to increase by an average of 260,000 barrels per day (1.3 percent) this year and by another 370,000 barrels per day (1.8 percent) in 2005. Motor gasoline demand, spurred by continued economic growth, is expected to increase by an average 2.0 percent per year during the forecast interval, despite substantial projected increases in real fuel costs per mile. Summer motor gasoline consumption is projected to be 1.8 percent higher than last summer, reflecting the offsetting forces of a 2.8-percent rise in real disposable income and a 21-percent increase in real fuel cost per mile.

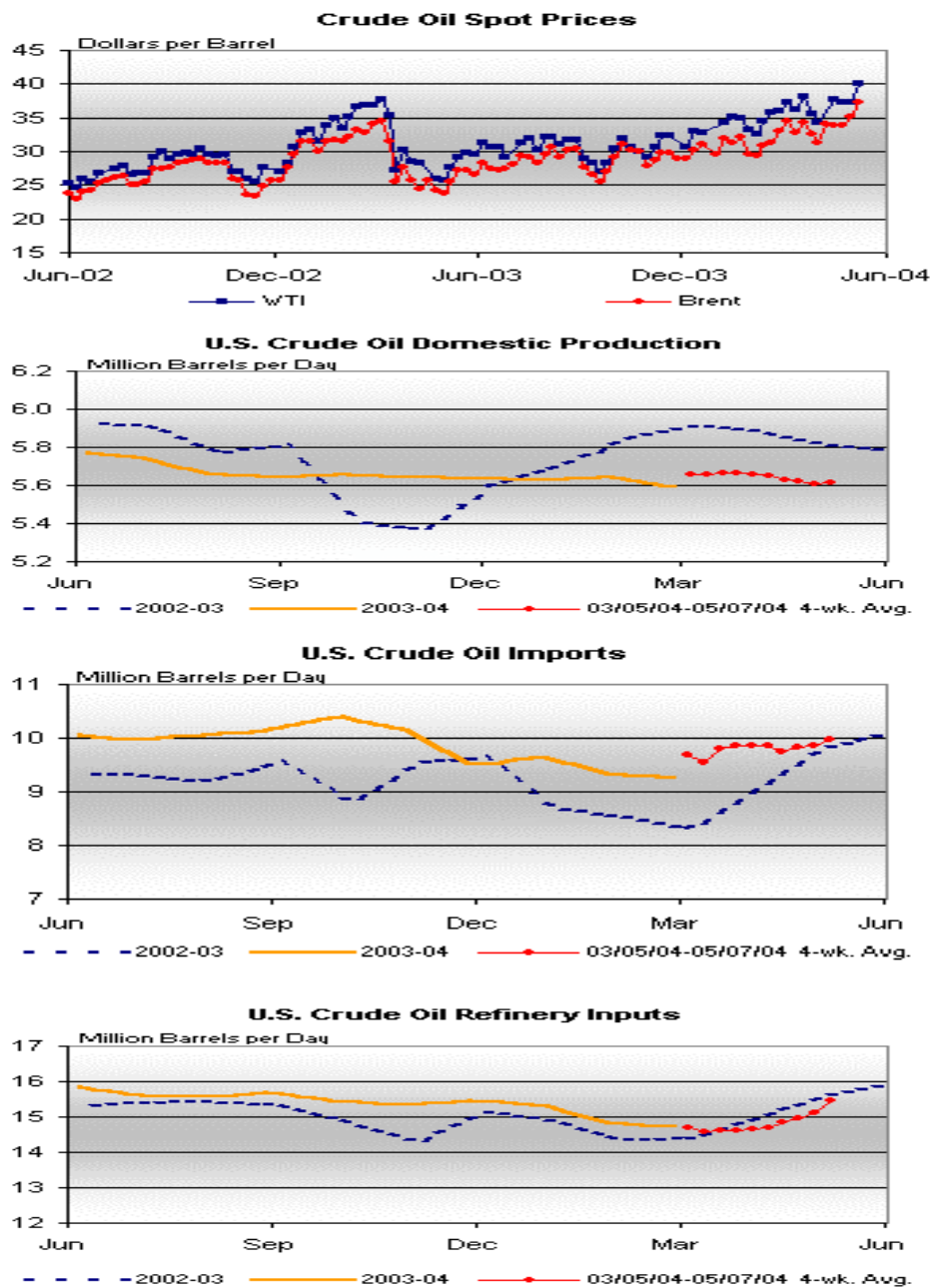
U.S. commercial supplies of crude oil on May 7 stood at 300 million barrels or 15.5 million barrels higher when compared to this time last year. Inventory levels are 30 million barrels above the Lower Operating Inventory Level, a level pre-determined by the U.S. Department of Energy below which localized distribution and shipping problems and intermittent product outages become increasingly likely. Supplies of crude oil have strengthened over the last month; however, total U.S. supplies remain at the lower end of the 5-year average.

Midwest Outlook

Since the beginning of the year, crude oil supplies in the Midwest have improved with supplies reported at 63 million barrels for the week ending May 7. Last year at this time, Midwest supplies stood at 55.4 million barrels.

Similarly, Gulf Coast Region supplies (a significant source of motor gasoline and diesel fuel to the Midwest) were higher compared to

last year with 153.7 million barrels reported on May 7 compared to 148 million barrels in 2003, an increase of 3.9 percent.



Source: U.S. Department of Energy, Energy Information Administration

Motor Gasoline

Gasoline prices in Missouri and throughout the nation continue to rise in response to higher consumer demand, higher crude oil prices and the uncertainty of adequate summer supplies of motor gasoline. Since January, the average retail prices for regular unleaded in the U.S. and Missouri have increased 39 and 34 percent, respectively. Missouri's price has risen from a January price of \$1.39 per gallon to \$1.93 through May 17 and the U.S. average retail price increased from \$1.51 to \$2.02 per gallon.

Gasoline supplies in the Midwest and Missouri are expected to remain tight throughout the summer due to abnormally high demand for motor gasoline during the first quarter and most of the second quarter of 2004. Expectations of a recovering economy could support higher consumer demand throughout most of the summer resulting in higher prices and lower supplies.

Demand

For 2004, motor gasoline sales in Missouri may increase by approximately 2.5 percent over 2003, slightly above last year's demand growth of 2.2 percent. Projected sales for 2004 are 3.195 billion gallons, up from 3.117 billion gallons in 2003. However, if the Missouri average retail price for motor gasoline this summer continues on its present course as a result of higher crude prices or unexpected interruptions in refinery or pipeline operations, the projected increase of 2.5 percent in demand may be smaller.

Since February, U.S. consumer demand for motor gasoline surged to 9 million barrels per day, an increase of over 500,000 barrels per day compared to the same period last year. U.S. summer demand is expected to be 9.32 million barrels per day, a new seasonal record. Comparing the period January-April 2003 to the same period in 2004, Missouri demand has increased by 400,000 barrels or 1.4 percent, increasing from 23.4 million barrels to 23.8 million barrels.

The domestic gasoline supply system is vulnerable to severe price shocks if major refinery or pipeline outages occur. Two factors that could reduce the risk of sharply higher pump prices would be a more rapid decline rate for crude oil prices than currently expected and solid improvement in the availability of gasoline import volumes from those seen so far this year.

Supply

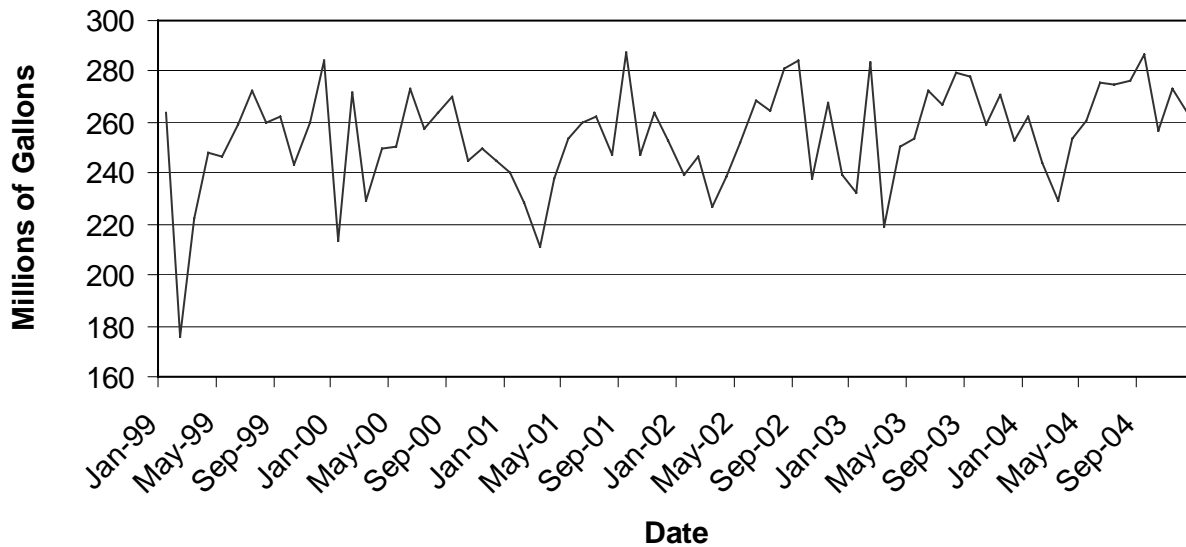
Current Midwest supplies stand at 51.9 million barrels as of May 7 compared to 48.4 million barrels for the same time last year. However, the Gulf Coast Region, a principle supplier of motor gasoline to the Midwest, currently retains a supply of only 62.2 million barrels compared to 63.1 million barrels in 2003.

U.S. refinery utilization has improved over the last month (94 percent) with refineries completing scheduled maintenance, but total available supplies of motor gasoline have been reduced due to lower imports. Gasoline production is expected to be 8.46 million barrels per day, a new record.

Price

U.S. retail regular gasoline prices are expected to average \$1.94 per gallon this April through September, up 38 cents from last summer's average. EIA projects national gasoline prices to peak in June at \$2.03 per gallon. Contributing factors include the expectation of high and volatile crude prices and low motor gasoline supply levels for much of the summer; the need for high levels of domestic production and imports to meet demand. Additional transportation and blending costs related to the substitution of ethanol for MTBE in certain markets, and the reduction in permissible sulfur content mandated by the Environmental Protection Agency will also help support higher prices.

Missouri Gasoline Sales



Missouri Gasoline Sales Projection (Millions of Gallons)

			Total All Grades	Historical (prior year)	% Change
Historical	2000	Total	3,017.6	2,998.2	+ 0.6
	2001	Total	2,991.6	3,017.6	- 0.8
	2002	Total	3,048.5	2,991.6	+ 1.9
	2003	Total	3,117.8	3,048.5	+ 2.2
	2004	January	262.2	232.4	+ 12.8
		February	243.8	283.3	- 13.9
		March	229.5	218.9	+ 4.8
Projection		April	253.7	251.1	+ 1.4
		May	260.5	253.9	+ 2.5
		June	275.9	272.3	+ 1.3
		July	274.5	267.0	+ 2.8
		August	276.1	279.7	- 1.2
		September	286.9	277.8	+ 3.2
		October	256.4	258.9	- 0.9
		November	273.0	270.6	+ 0.8
		December	264.6	252.9	+ 4.6
	2004	Total	3,157.1	3,117.8	+ 1.2

Refinery Operations and Petroleum Inventory Levels

Relatively low petroleum inventory levels will continue as a source for potential problems as the summer driving season gets underway. Inventory levels have trended downward over the past two decades, while petroleum consumption has increased. The combination of these two factors may have created additional volatility in prices when an unexpected supply/demand imbalance occurred.

Reported inventory figures include product at all stages of production and distribution. For example, product currently moving through pipelines, in tanker trucks, by barge, or moving through a refinery is counted as inventory, just as is product sitting in a storage tank. Therefore, some level of inventory is necessary to ensure that production and distribution continues uninterrupted. The U.S. Energy Information Administration, with the help of industry experts, has estimated the minimum amount of product that must be held in order to ensure seamless production and distribution, referred to as the Lower Operating Inventory Level (LOL), currently 270 million barrels. If inventories fall below this level, localized distribution and shipping problems and intermittent product outages become increasingly likely.

Demand for gasoline, diesel fuel and other petroleum products is satisfied from three different sources: refinery production, imports and inventories. With reliable and accurate forecasts for the level of demand, refiners and suppliers can plan ahead to secure the resources necessary to produce or import whatever amount is necessary to meet demand. In the event of an unexpected surge in demand or reduction in supplies, there are significant constraints on the ability of refiners or suppliers to increase production or imports in the short-term. Inventories become the means of satisfying the short-term supply/demand imbalance.

Inventory levels nationally, and particularly in the Midwest region, have trended downward

over the past two decades. Improvements in technology, which allow refiners and suppliers to better manage production and inventories and monitor sales, have allowed inventory levels to decline with no loss in efficiency. Seasonal differences in gasoline specifications to meet local environmental quality requirements in regions throughout the country, beginning in the late 1980s, may have also contributed to the declining trend in inventory levels. At the regional level, increased capacity to import gasoline has allowed refiners and suppliers to maintain less in inventory.

As of May 7, 2004, U.S. commercial supplies of gasoline were estimated at 202.5 million barrels, enough to satisfy demand for nearly 22 days. This is down from 201 million barrels in 2003, or enough to satisfy demand for more than 24 days. Regional inventories averaged 51.9 million barrels, down from 48 million barrels in 2003. The 47 million barrel inventory level is enough to satisfy demand for only two weeks.

When distribution networks and refineries operate without unplanned interruptions, inventories play a small roll in meeting demand. They typically build in winter months and are drawn down during the summer driving season. The amount by which inventories build or are drawn is primarily determined by how close actual demand is to forecasted levels and whether refineries are shut down (or operate at reduced levels) due to planned maintenance.

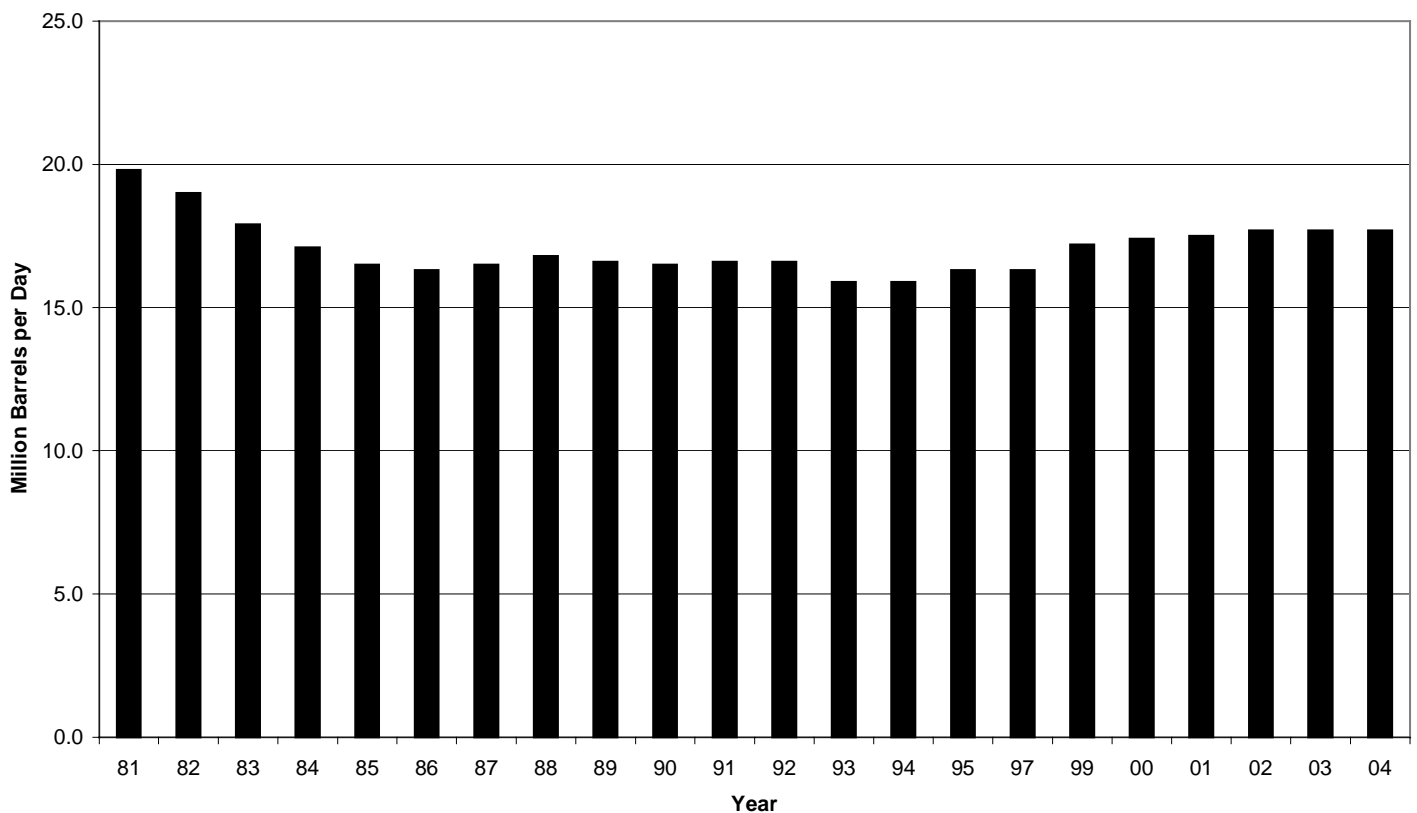
Inventory levels are much more critical at times when an unplanned outage occurs at a refinery or in the distribution system. The Midwest experienced such outages in 2000 (a rupture of the Explorer Pipeline in the spring) and 2001 (when the refineries in Wood River and Lamont, Illinois experienced production problems). In each case, the region experienced significant gasoline price volatility following these events. While the total distillation capacity of U.S. refineries is down only 10 percent from the peak

level reached in 1981, the total number of refineries is less than half of what it was in 1981(now at 145 operating refineries). The increasing concentration of refinery operations has placed increasing significance on inventories since each refinery now accounts for a larger percentage of total production than was the case in years past (since unplanned outages at refineries takes away a larger portion of

production). The downward trend in inventories is not forecast to reverse course anytime soon. With no unplanned interruptions in supply, relatively low inventory levels will continue to play a small roll in satisfying demand.

In the absence of domestic refinery capacity, Missouri is dependent upon the reliability of out-of-state production to meet its petroleum needs.

U.S. Refining Capacity 1981 to 2004



Natural Gas

Underground storage facilities reported net April injections of 199 billion cubic feet, well above the previous 5-year average of 139 billion. This left natural gas inventories at the end of April only about 2 percent below the 5-year average level and 37 percent higher than last year at this time. Natural gas inventories are expected to track near normal levels as long as weather conditions remain close to normal.

Natural gas spot prices (composites for producing area hubs) are likely to average about \$5.80 per thousand cubic feet (mcf) this year. Spot prices averaged about \$5.50 per mcf in the first quarter of this year but are currently ranging from \$6 to the mid \$6 range. Barring cooler-than-normal weather this summer, the likelihood appears small that spot prices will fall significantly below \$5.80 per mcf for the rest of 2004. Spot prices are expected to rise by about \$0.30 per mcf in 2005. This outcome depends on modest growth in domestic production this year and next.

Demand

In 2004, natural gas demand is expected to increase by about 1.3 percent due to economic growth, weather factors, very strong oil prices and, in a comparatively new development, tight coal markets as indicated by high spot prices for coal in the eastern producing areas. Demand growth in 2005 is expected to be minimal (0.3 percent) as some of the current pressure on natural gas in the electric power sector eases along with spot coal and oil prices.

In Missouri, natural gas demand is projected to grow by 4.2 percent due to similar economic growth and an overall increase in the price of crude oil and related petroleum products that may be used as a substitute fuel by electric generators. Natural gas use by electric utilities may grow significantly due to additional gas-

fired electric generation in response to an anticipated increase in the demand for electricity to cool homes; and, an increase in demand for industrial process energy.

Supply

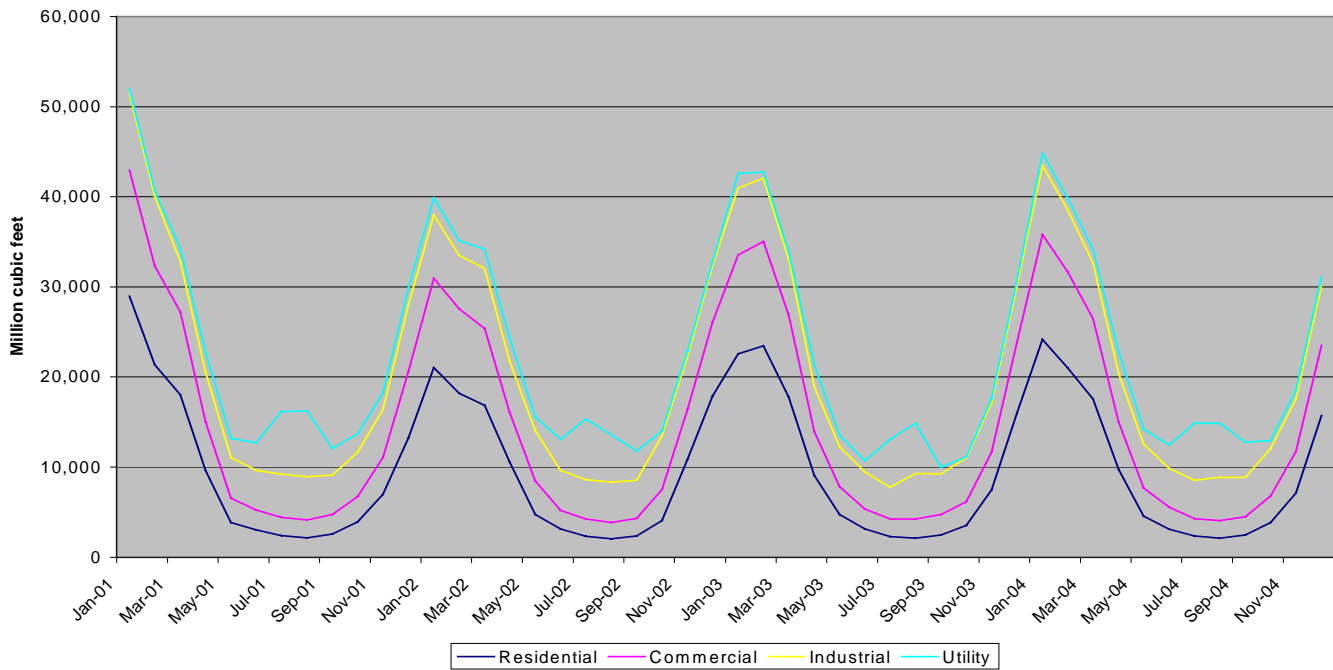
Domestic natural gas production is estimated to have increased by approximately 0.5 percent in 2003. Growth of about 1 percent in 2004 is expected as new natural gas well completions, which totaled an estimated 20,000 in 2003, remain strong at close to 24,000 wells per year over the next 2 years.

Missouri has no commercial natural gas production and relies on the availability of natural gas from out-of-state sources, particularly from the New Mexico and Gulf Coast region of the U.S.

Price

U.S. average price for natural gas is estimated to remain in the mid-\$5.50 range (per thousand cubic feet) this year. Comparing 2002 with 2003 natural gas prices, Missouri city-gate price rose by 33.7 percent, from \$4.56 to \$6.10. Industrial customers experienced the highest increase in gas costs with an increase of 32.8 percent, moving from \$6.02 to \$8.00 per thousand cubic feet. Residential customers experienced an increase of 18.6 percent, with average prices rising from \$8.00 to \$9.49. This is a significant increase, but is still below the record price set in 2001 at \$10.47. Commercial customers saw a 17.8 percent increase, with prices climbing from \$7.34 to \$8.65, yet still below the high set in 2001 at \$9.82. If the average U.S. price changes during the late summer and early fall of 2004, these price changes will be passed on to Missouri customers.

**Missouri Natural Gas Sales
2001 to 2004**



**Missouri Natural Gas Sales Projection
(Millions of cubic feet)**

			Residential	Commercial	Industrial	Utility	Total
Historical	2001	Total	116,188	64,924	67,846	32,805	281,763
	2002	Total	114,185	61,897	66,593	29,911	272,585
	2003	Total	114,613	62,758	64,022	20,845	262,238
Projection	2004	January	24,188	11,635	7,670	1,326	41,819
		February	21,005	10,641	6,895	1,290	39,831
		March	17,559	8,933	6,163	1,449	34,104
		April	9,746	5,264	5,399	2,391	22,800
		May	4,554	3,156	4,851	1,655	14,116
		June	3,101	2,450	4,309	2,583	12,443
		July	2,351	1,951	4,232	6,321	14,855
		August	2,112	1,961	4,780	6,029	14,882
		September	2,478	2,019	4,378	3,905	12,780
		October	3,850	2,940	5,265	884	12,939
		November	7,137	4,591	5,847	964	18,539
		December	15,704	7,821	6,635	972	31,132
	2004	Total	113,785	63,362	66,424	29,769	273,340
	03-04	Change	-0.7%	+0.9	+3.7	+42.8%	+4.2%

Electricity

Demand

U.S. electricity demand in 2004 is expected to increase by 1.4 percent, driven by accelerated growth in the economy and weather-related increases in the first and the fourth quarters. The highest growth rate is projected for the commercial sector, at approximately 2 percent, compared with about 1-1.6 percent for industrial and 1-1.4 percent for residential electricity demand.

The projected growth in commercial and industrial electricity demand will require significant additions of base load generating capacity or significant demand reduction through improved energy efficiency. From 2000 to 2003, 110 gigawatts (GW) of combined-cycle capacity were installed in the U.S. During this period, 69 GW of peaking capacity were added in the U.S.

Supply

In 2000 and 2001, higher U.S. wholesale electricity prices encouraged the development of new generation facilities. Since 1985, new U.S. capacity additions were 27 Gw in 2000, 42 GW in 2001 and 72 GW in 2002, and utilities were on pace to build another 45 GW by the end of 2003. Recently, however, developers have reported that they are delaying or canceling planned plants.

New U.S. additions are expected to slow after 2003, and that trend is expected to continue in the near term. Most of the recent additions are natural-gas-fired. Of the 187 GW added between 2000 and 2003, 175 GW were natural-gas-fired, including 110 GW of combined-cycle capacity and 65 Gw of combustion turbine capacity, which is used mainly when demand for electricity is high. Only about 5 GW of new renewable plants—mostly wind—and less than 1 GW of new coal-fired capacity were added over the same period.

At present, the combined capacity of Missouri's largest electric utilities exceeds their combined required capacity (which includes a required reserve margin) by about four percent, a surplus of about 970 megawatts (MW).

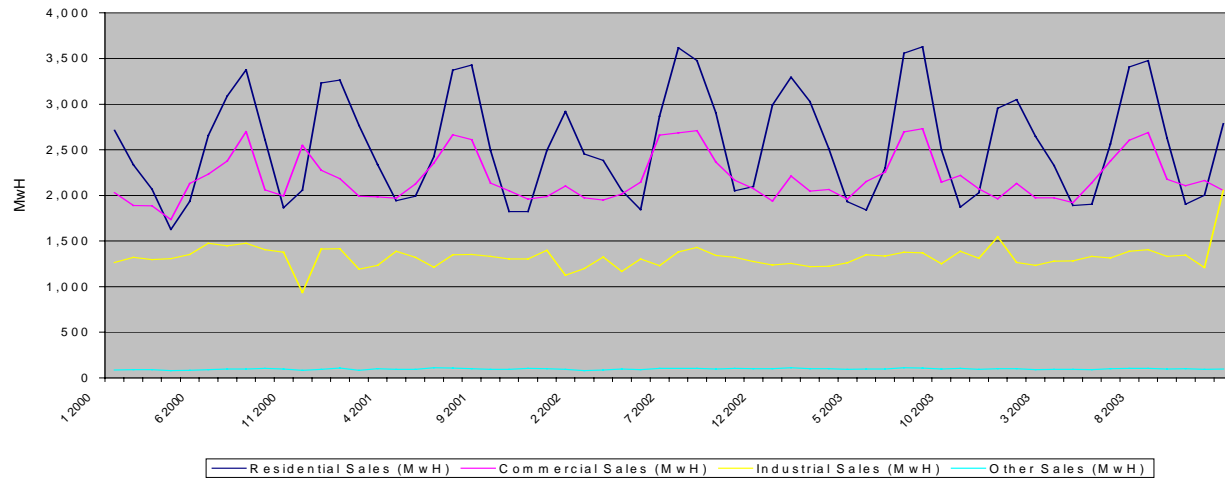
This includes the capacity of four investor-owned regulated utilities; Associated Electric Cooperative Inc. (AECI), the primary source of power for 51 electric distribution cooperatives; and the state's three largest municipal electric utilities, Springfield City Utilities, Independence Power and Light and Columbia Water and Light.

Price

Average U.S. electricity prices, in real 2002 dollars, are expected to decline by 8 percent, from 7.2 cents per kilowatthour (kWh) in 2002 to 6.6 cents by 2008, and to remain relatively stable until 2011. From 2002 to 2003, Missouri's average price for electricity fell by 1.6 percent, dropping from 6.09 cents to 5.99 cents per kWh. During this period, residential prices fell 1.2 percent, from 7.06 cents to 6.97 cents per kWh. Commercial prices fell 1.5 percent, from 5.88 cents to 5.79 cents per kWh and industrial rates fell 2 percent from 4.42 cents to 4.33 cents per kWh.

Generation costs represent about 64 percent of electricity prices and distribution costs account for about 28 percent of total electricity price and is expected to decline at an average annual rate of 0.7 percent as the cost of the distribution infrastructure is spread out over a growing amount of total electricity sales. Transmission prices are expected to increase at an average annual rate of 0.9 percent because of the increased investment needed to meet the projected growth in electricity demand. Delivered electricity prices for residential, commercial, and industrial customers are projected to fall by 5, 10, and 9 percent, respectively, from 2002 to 2013.

**Missouri Electricity Sales
2000 to 2003**



**Missouri Electricity Sales Projection
(Millions of kWh)**

			Residential	Commercial	Industrial	Other	Total
Historical	2000	Total	29,577	25,870	16,074	1,100	72,621
	2001	Total	30,164	26,023	15,809	1,195	73,191
	2002	Total	31,677	26,789	15,334	1,173	74,973
	2003	Total	30,944	26,580	15,627	1,205	74,356
Projection	2004	January	3,049	2,131	1,265	100	6,545
		February	2,647	1,976	1,234	89	5,946
		March	2,327	1,972	1,280	96	5,675
		April	1,889	1,920	1,281	92	5,182
		May	1,902	2,139	1,332	91	5,464
		June	2,565	2,376	1,315	101	6,357
		July	3,410	2,605	1,389	106	7,510
		August	3,478	2,689	1,407	104	7,678
		September	2,629	2,178	1,333	99	6,239
		October	1,903	2,108	1,347	100	5,458
		November	2,001	2,164	1,208	95	5,468
		December	2,789	2,056	1,332	98	6,275
	2004	Total	30,589	26,314	15,723	1,171	73,797
	03-04	Change	-1.1%	-1.0%	-0.6%	-2.8%	-0.7%

Missouri Electric Generating Capacity Planned or Added Since July 2001

